

## **REMARKS**

The Applicants have received and reviewed the non-final Office Action mailed March 6, 2008. The Applicants originally submitted claims 1-25 in this application. By a previous Response to a Restriction Requirement dated February 26, 2007, the Applicants withdrew claims 7-10 and 20-25. By a previous Response and Amendment filed June 25, 2007, the Applicants amended claims 1 and 11, but did not cancel any claims. By a previous Response filed June 3, 2008, the Applicants did not amend any claims and did not cancel any claims. By the present Response, the Applicants have not amended any claims and have not canceled any claims. Thus, claims 1-25 remain pending in this application.

### ***Claim Rejections Under 35 U.S.C. §103***

The Examiner rejected claims 1-2 under 35 U.S.C. §103(a) as being unpatentable over Sudo (U.S. Patent No. 6,839,335), further in view of Dent (U.S. Patent No. 6,680,928) and Hoang et al. (U.S. Patent Publication No. 2004/0246973). The Applicants respectfully traverse the rejection in view of the remarks set forth below.

As also noted in the Applicants' previous response filed June 3, 2008, the Applicants respectfully point out to the Examiner that nothing in Sudo alone or in combination with Dent and/or Hoang et al. discloses or suggests 1) encoding each of a plurality of information signals with a spreading code to generate corresponding coded signals, 2) allocating the same bits from each of the coded signals to a respective one of a plurality of transmission channels, then, 3) for each transmission channel, analog summing the coded signals allocated thereto (i.e., the coded signals corresponding to the same bit from each of the coded signals corresponding to the plurality of information signals) to generate a modulation signal, and 4) generating an optical transmission signal for each transmission channel using a corresponding modulation signal.

The Examiner stated that col. 1, lines 57-64 of Sudo disclose the Applicants' step of allocating coded signals corresponding to the same bit of the spreading codes to a respective one of a plurality of transmission channels. However, the Applicants

respectfully note that the language cited in Sudo refers to a portion of Inverse Fourier Transform processing by an IFFT processing section (4), which subjects chip data sequences to frequency division multiplexing. Furthermore, the Applicants respectfully note that any coded signal allocation that may be disclosed in or suggested by the cited language in Sudo occurs only after the spread signals have been added by the addition section (2) in Sudo. By comparison, in the Applicants' claimed invention, the encoded signals are first allocated to each of a plurality of transmission channels (by the same spreading code bit) and then, for each transmission channel, the allocated encoded signals are then summed using an analog summer corresponding to each of the transmission channels.

Therefore, in Sudo, spread signals first are added using the addition section (2), and then are allocated to a corresponding subcarrier using the IFFT processing section (4), as is disclosed in col. 1, lines 57-64 of Sudo. In the Applicants' claimed invention, information signals encoded by respective spreading codes first are allocated to a plurality of transmission channels and then, for each transmission channel, the respective allocated encoded signals are summed using a separate analog summer for each transmission channel. As recited in the Applicants' claims, the coded signals are allocated (by the same bit) to a respective one of a plurality of transmission channels and, in each transmission channel, the coded signals allocated thereto (i.e., allocated to the respective transmission channel) are analog summed. Thus, according to the Applicants' claimed invention, the coded signals are analog summed (by transmission channel) only after the coded signals have been allocated to a transmission channel.

Clearly, in the Applicants' claimed invention, the order of the transmission channel allocation process and the analog summing process is completely opposite the order of the addition process and the subcarrier allocation process in Sudo. As such, the Applicants' claimed transmission method processes information signals in a completely different manner and therefore yields a completely different result than the radio communication method in Sudo, even if the channel allocation processes and the summation processes are similar, which they are not. The Applicants allocate the coded signal from the same spreading code bit for a plurality of information signals to a respective one of a plurality of transmission channels; Sudo assigns chips to a

corresponding plurality of subcarriers using an Inverse Fourier Transform process. Also, the Applicants analog sum the allocated coded signals, for each of the plurality of transmission channels; Sudo interleaves coded signals (before transmission channel allocation) using a serializer.

For at least these reasons, the Applicants respectfully submit that Sudo alone or in combination with Dent and Hoang et al. does not disclose or suggest the Applicants' claimed invention. The combination of Dent and/or Hoang et al. with Sudo does not change the order of Sudo's initial summing process and then subsequent allocation process compared to the Applicants' claimed transmission channel allocation process and subsequent analog summing process. Therefore, the Applicants respectfully request that the Examiner withdraw the rejection of claims 1-2 under 35 U.S.C. §103(a) as being unpatentable over Sudo and further in view of Dent and Hoang et al.

The Examiner rejected claim 3 under 35 U.S.C. §103(a) as being unpatentable over Sudo, Dent, and Hoang et al., and further in view of Shattil (U.S. Patent Publication No. 2002/0150070). The Applicants respectfully traverse the rejection in view of the remarks set forth below.

As discussed previously herein, the Applicants' claimed invention recited in claim 1 is neither disclosed in nor suggested by Sudo combined with Dent and Hoang et al. Shattil, which is cited for its disclosure of the use of quasi-orthogonal spreading codes, does not cure the deficiencies of Sudo, Dent and Hoang et al. with respect to disclosing or suggesting the Applicants' invention as recited in claim 1. Accordingly, the Applicants respectfully submit that Shattil in combination with Sudo, Dent and Hoang et al. does not disclose or suggest the Applicants' invention as recited in claim 1.

Claim 3 depends directly from independent claim 1, and incorporates all of the features of claim 1. Furthermore, claim 3 includes other features that, when combined with the subject matter of claim 1, are neither shown in nor suggested by the art of record. For at least these reasons, the Applicants respectfully submit that claim 3 is patentable over Sudo, Dent and Hoang et al., and further in view of Shattil, and respectfully request that the rejection be withdrawn.

The Examiner rejected claims 4 and 5 under 35 U.S.C. §103(a) as being unpatentable over Sudo, Dent and Hoang et al., and further in view of van der Gracht et

al. (U.S. Patent No. 4,835,517). The Applicants respectfully traverse the rejection in view of the remarks set forth below.

As discussed previously herein, the Applicants' claimed invention recited in independent claim 1 is neither disclosed in nor suggested by Sudo in combination with Dent and Hoang et al. The van der Gracht et al. reference, which is cited for its disclosure of the use of data spreading using exclusive-NORing, does not cure the deficiencies of Sudo, Dent and Hoang et al. with respect to disclosing or suggesting the Applicants' invention as recited in claim 1. Accordingly, the Applicants respectfully submit that the van der Gracht et al. reference, taken either alone or in combination with Sudo, Dent and Hoang et al., does not disclose or suggest the Applicants' invention as recited in claim 1.

The rejected claims 4 and 5 depend directly or indirectly from claim 1, and incorporate all of the features of claim 1. Furthermore, claims 4 and 5 include other features that, when combined with the subject matter of claim 1, are neither shown in nor suggested by the art of record. Therefore, the Applicants respectfully request that the Examiner withdraw the rejection of claims 4 and 5 under 35 U.S.C. §103(a) over Sudo in view of Dent and Hoang et al., and further in view of van der Gracht et al.

The Examiner rejected claim 6 under 35 U.S.C. §103(a) as being unpatentable over Sudo, Dent and Hoang et al., further in view of Balachandran et al. (U.S. Patent No. 7,187,715). The Applicants respectfully traverse the rejection in view of the remarks set forth below.

As discussed previously herein, the Applicants' claimed invention recited in independent claim 1 is neither disclosed in nor suggested by Sudo alone or in combination with Dent and Hoang et al. The Balachandran et al. reference, which is cited for its disclosure of spreading an information signal by multiplying each bit of the information signal with the corresponding bit of a spreading code, does not cure the deficiencies of Sudo, Dent and Hoang et al. with respect to disclosing or suggesting the Applicants' invention as recited in claim 1. Accordingly, the Applicants respectfully submit that the Balachandran et al. reference, either alone or in combination with Sudo, Dent and Hoang et al., does not disclose or suggest the Applicants' invention as recited in claim 1.

The rejected claim 6 depends directly from claim 1 and incorporates all of the features of claim 1. Furthermore, claim 6 includes other features that, when combined with the subject matter of claim 1, are neither shown in nor suggested by the art of record. Therefore, the Applicants respectfully request that the Examiner withdraw the rejection of claim 6 under 35 U.S.C. §103(a) over Sudo, Dent and Hoang et al., and further in view of Balachandran et al.

The Examiner rejected claims 11 and 12 under 35 U.S.C. §103(a) as being unpatentable over Sudo and further in view of Dent and Ahn et al. ("A Symmetric-Structure CDMA-PON System and Its Implementation," IEEE PHOTONICS TECHNOLOGY LETTERS, Vol. 14, No. 9, September 2002). The Applicants respectfully traverse the rejection in view of the remarks set forth below.

As discussed hereinabove, nothing in Sudo alone or combined with Dent discloses or suggests an information signal transmission apparatus that allocates the coded signals corresponding to the same bits of the spreading code to a respective one of a corresponding plurality of transmission channels, wherein the same bits from each of the coded signals allocated to a given transmission channel are summed using a corresponding analog summer, and wherein, in each transmission channel, the output of the corresponding analog summer is used as a modulation input to an optical transmitter. The Applicants' invention as recited in claims 11 and 12 includes a signal allocator for allocating coded signals corresponding to the same bit of the spreading codes to a respective one of the transmission channels and, in each transmission channel, an analog summer with an output connected to the modulation input of a transmitter. Each analog summer sums respective bits from each of the spread spectrum encoded information signals, i.e., the first analog summer sums the first bits from each of the spread spectrum encoded information signals, the second analog summer sums the second bits from each of the spread spectrum encoded information signals bits, and so on. Nothing in Sudo alone or combined with Dent discloses or suggests such elements, and therefore does not disclose or suggest the Applicants' invention as recited in claims 11 and 12.

The Ahn et al. reference, which is cited for its disclosure of a WDM-CDMA transmitter, does not cure the deficiencies of Sudo and Dent with respect to disclosing

or suggesting the Applicants' invention as recited in claims 11 and 12. Accordingly, the Applicants respectfully submit that the Ahn et al. reference, either alone or in combination with Sudo and Dent, does not disclose or suggest the Applicants' invention as recited in claims 11 and 12. Therefore, the Applicants respectfully request that the Examiner withdraw the rejection of claims 11 and 12 under 35 U.S.C. §103(a) as being unpatentable over Sudo and further in view of Dent and Ahn et al.

The Examiner rejected claim 13 under 35 U.S.C. §103(a) as being unpatentable over Sudo, Dent and Ahn et al., and further in view of Shattil (U.S. Patent Publication No. 2002/0150070). The Applicants respectfully traverse the rejection in view of the remarks set forth below.

As discussed previously herein, the Applicants' claimed invention recited in claim 11 is neither disclosed in nor suggested by Sudo combined with Dent and Ahn et al. Shattil, which is cited for its disclosure of the use of quasi-orthogonal spreading codes, does not cure the deficiencies of Sudo, Dent and Ahn et al. with respect to disclosing or suggesting the Applicants' invention as recited in claim 11. Accordingly, the Applicants respectfully submit that Shattil in combination with Sudo, Dent and Ahn et al. does not disclose or suggest the Applicants' invention as recited in claim 11.

Claim 13 depends directly from independent claim 11, and incorporates all of the features of claim 11. Furthermore, claim 13 includes other features that, when combined with the subject matter of claim 11, are neither shown in nor suggested by the art of record. For at least these reasons, the Applicants respectfully submit that claim 13 is patentable over Sudo, Dent, and Ahn et al., and further in view of Shattil, and respectfully request that the rejection be withdrawn.

The Examiner rejected claims 14-16 under 35 U.S.C. §103(a) as being unpatentable over Sudo, Dent and Ahn et al., and further in view of Way (U.S. Patent Publication No. 2002/0021464). The Applicants respectfully traverse the rejection in view of the remarks set forth below.

As discussed previously herein, the Applicants' claimed invention recited in claim 11 is neither disclosed in nor suggested by Sudo combined with Dent and Ahn et al. The Way reference, which is cited for its disclosure of an optical transmitter, does not cure the deficiencies of Sudo, Dent and Ahn et al. with respect to disclosing or

suggesting the Applicants' invention. Accordingly, the Applicants respectfully submit that the Way reference, either alone or in combination with Sudo, Dent and Ahn et al., does not disclose or suggest the Applicants' invention as recited in claim 11.

The rejected claims 14-16 depend directly or indirectly from independent claim 11, and incorporate all of the features of claim 11. Furthermore, claims 14-16 include other features that, when combined with the subject matter of claim 11, are neither shown in nor suggested by the art of record. Therefore, the Applicants respectfully request that the Examiner withdraw the rejection of claims 14-16 under 35 U.S.C. §103(a) over Sudo, Dent and Ahn et al., and further in view of the Way reference.

The Examiner rejected claims 17 and 18 under 35 U.S.C. §103(a) as being unpatentable over Sudo, Dent and Ahn et al., and further in view of van der Gracht et al. The Applicants respectfully traverse the rejection in view of the remarks set forth below.

As discussed previously herein, the Applicants' claimed invention recited in independent claim 11 is neither disclosed in nor suggested by Sudo in combination with Dent and Ahn et al. The van der Gracht et al. reference, which is cited for its disclosure of the use of data spreading using exclusive-NORing, does not cure the deficiencies of Sudo, Dent and Ahn et al. with respect to disclosing or suggesting the Applicants' invention as recited in claim 11. Accordingly, the Applicants respectfully submit that the van der Gracht et al. reference, either alone or in combination with Sudo, Dent and Ahn et al., does not disclose or suggest the Applicants' invention as recited in claim 11.

The rejected claims 17 and 18 depend directly from claim 11, and incorporate all of the features of claim 11. Furthermore, claims 17 and 18 include other features that, when combined with the subject matter of claim 11, are neither shown in nor suggested by the art of record. Therefore, the Applicants respectfully request that the Examiner withdraw the rejection of claims 17 and 18 under 35 U.S.C. §103(a) over Sudo, Dent and Ahn et al., and further in view of van der Gracht et al.

The Examiner rejected claim 19 under 35 U.S.C. §103(a) as being unpatentable over Sudo, Dent and Ahn et al., and further in view of Balachandran et al. The Applicants respectfully traverse the rejection in view of the remarks set forth below.

As discussed previously herein, the Applicants' claimed invention recited in independent claim 11 is neither disclosed in nor suggested by Sudo alone or in

combination with Dent and Ahn et al. The Balachandran et al. reference, which is cited for its disclosure of spreading an information signal by multiplying each bit of the information signal with the corresponding bit of a spreading code, does not cure the deficiencies of Sudo, Dent and Ahn et al. with respect to disclosing or suggesting the Applicants' invention as recited in claim 11. Accordingly, the Applicants respectfully submit that the Balachandran et al. reference in combination with Sudo, Dent and Ahn et al., does not disclose or suggest the Applicants' invention as recited in claim 11.

The rejected claim 19 depends directly from claim 11 and incorporates all of the features of claim 11. Furthermore, claim 19 includes other features that, when combined with the subject matter of claim 11, are neither shown in nor suggested by the art of record. Therefore, the Applicants respectfully request that the Examiner withdraw the rejection of claim 19 under 35 U.S.C. §103(a) over Sudo, Dent and Ahn et al., and further in view of Balachandran et al.



**CONCLUSION**

In view of the foregoing, the Applicants respectfully submit that all rejections have been overcome and/or traversed and that the application now is in full condition for allowance. Accordingly, the Applicants earnestly solicit early and favorable action. Should there be any further questions or reservations, the Examiner is urged to telephone the Applicants' undersigned attorney at (770) 709-0012.

Respectfully submitted,

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